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EVALUATION AND DOCUMENTATION OF TREES AT

THE KIRKLAND COTTAGES
7845 NE 122nd Place
Kirkland, WA 98034

February 10, 2015

PREPARED FOR:

Mark Putzke
Chandler Homes, LLC
10220 NE 110th Street
Kirkland, WA 98033

PREPARED BY:

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EXECUTIVE SUMMARY

A total of 67 trees were evaluated. They can be summarized as follows:

CURRENT HEALHT RATING SUMMARY		
# of Trees	Rating	%
3	Dead	4.5%
0	Dying	0.0%
6	Poor	9.0%
25	Fair	37.3%
21	Good	31.3%
10	Very Good	14.9%
2	Excellent	3.0%
67	**Total # of Trees Evaluated**	**100.0%**

- There are 10 trees on adjacent properties to the south, west, and east.
- There are no right-of-way trees impacted by this project.
- There are 57 trees on the subject property.

ASSIGNMENT

Mark Putzke of Chandler homes, contracted with Gilles Consulting to evaluate the trees at the Kirkland Cottages project at 7845 NE 122nd Place in Kirkland, Washington. The property is being re-developed and the City of Kirkland requires an extensive analysis of the trees as part of the permit process. This report provides the analysis. The information in this report can be utilized to create a Tree Plan as required by Chapter 95 of the Kirkland Code.

METHODOLOGY

To evaluate the trees and to prepare the report, I drew upon my 30+ years of experience in the field of arboriculture and my formal education in natural resources management, dendrology, forest ecology, plant identification, and plant physiology. I also followed the protocol of the International Society of Arboriculture (ISA) for Visual Assessment (VA) that includes looking at the overall health of the trees as well as the site conditions. This is a scientifically based process to look at the entire site, surrounding land and soil, as well as a complete look at the trees themselves.

In examining each tree, I looked at such factors as: size, vigor, canopy and foliage condition, density of needles, injury, insect activity, root damage and root collar health, crown health, evidence of disease-causing bacteria, fungi or virus, dead wood and hanging limbs.

Tree Tags

The trees were tagged and numbered 701 through 767. The tags are made of shiny aluminum approximately one inch by three inches in size and are attached to the tree with staples and a one foot strip of brightly colored survey tape. The tags were placed as high as possible to minimize their removal and were generally placed on the backsides of the trees as inconspicuously as possible. Please refer to *Attachment 1, Topographic Survey* for an orientation to the site and the approximate location of the trees.

Missing Trees

There were a few trees that were not included on the survey. They were labeled with the next number in the sequence and then their approximate location was indicated on the included site plan. These trees may need to be surveyed to determine their exact location in relation to the proposed site improvements and their retainability.

OBSERVATIONS

The subject property is an irregularly shaped parcel that is on the south side of 122nd Place NE. There is a stream that runs parallel to the roadway that spans the property. The topography is complex with slopes of varying degrees and a flat area where the existing wood house and out buildings are.

Photo # 1: A Google Earth Image of the subject property and surrounding area.

The trees are mostly grouped in the stream ravine and above the south side of the driveway. There are a few landscape species planted but the majority of the trees are the typical lowland Puget Sound native species with associated shrubs and ground cover plants.

In an effort to present the information and conclusions for each tree in a manner that is clear and easy to understand, as well as to save paper, I have included a detailed spreadsheet, *Attachment 2, Tree Inventory/Condition Spreadsheet*. All the same information from the ISA Tree Hazard Form is included in this spreadsheet and the attached glossary. The descriptions on the spreadsheet were left brief in order to include as much pertinent information as possible and to make the report manageable. The attached glossary provides a detailed description of the terms used in the spreadsheet and in this report. It can be found in *Attachment 3, Glossary*. A brief review of these terms and descriptions will enable the reader to rapidly move through the spreadsheet and better understand the information.

Additional Testing

The trees all presented signs and/or symptoms that were readily discernible using the visual tree evaluation system. These signs and/or symptoms indicate extensive internal decay and/or structural defects in some trees and solid trunks and lack of disease in others. Therefore, no additional tests were performed during this site visit.

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

Right-of-Way Trees

There are no right-of-way trees impacted by this project.

Trees on Adjacent Properties

There are ten trees on adjacent properties.

- Trees 701 – 703 are located south of the south property line near the mutual driveway with the neighbor to the west.
    - All three are Significant and Viable.
    - All three can be adequately protected during demolition and construction.
- Trees 704 – 707 are located west of the subject property near the southwest property corner.
    - They are all *Significant.*
    - Three of the four are *Viable,* one is *Non-Viable.*
- Tree 708 is a Maple just east of the east property line near the southeast property corner.
    - It is *Significant* but *Non-Viable.*
- Trees 709 and 710 are east of the east property line east of the house and sheds.
    - They are both *Significant* and *Viable.*

- They can be adequately protected during demolition and construction.

Note: It is recommended that the property owners with the two *Non-Viable trees* be contacted to inform them that they have a potential safety hazard on their property.

Trees on the Subject Property

There are 57 *Significant Trees* on the subject property. Their current health condition can be summarized as follows:

CURRENT HEALHT RATING SUMMARY		
# of Trees	Rating	%
3	Dead	5.3%
0	Dying	0.0%
3	Poor	4.5%
22	Fair	32.8%
20	Good	29.9%
8	Very Good	11.9%
1	Excellent	1.5%
57	**Total # of Trees Evaluated**	**85.9%**

The six Dead and Poor Condition trees are *Non-Viable* and are recommended for removal for safety. The remaining 51 trees in Fair, Good, Very Good or Excellent Condition are all *Viable* and have the potential to be retained if design, permit requirements, and construction methodologies allow.

Minimum Tree Density Calculations

The City of Kirkland's Tree Code now requires that each lot have a minimum density of at least 30 tree credits per acre. The density may consist of existing trees, supplemental trees, or a combination of existing and supplemental trees. The tree credits are calculated, as indicated below, by dividing the size of the individual lot by the square footage in an acre and multiplying by 30: lot area in square feet / 43,560 square feet x 30 (rounded to the nearest whole #) = the number of tree credits required for each lot.

In this case, the property is 42,028 square feet, (0.96 acres). So the calculation is as follows:

42,028 / 43,560 x 30 = 28.9 or 29 tree credits minimum that must be retained.

Please refer to Chapter 95, Tree Management and Required Landscaping, Section 95.35.5 and Table 95.35.1 of the Kirkland Municipal Code to see how tree credits are assigned and for more information about tree retention. Please be aware that the City can and often does require the retention of additional trees above the minimum. This especially applies to trees in very good or excellent condition located in buffers, in building setbacks, and trees in groves—even groves that extend across property lines.

The information from this report will need to be transferred to a *Tree Plan* as required in Kirkland Code section *95.35.2.B Tree Plan Requirements.*

Tree Protection Measures

In order for trees to survive the stresses placed upon them in the construction process, tree protection must be planned in advance of equipment arrival on site. If tree protection is not planned integral with the design and layout of the project, the trees will suffer needlessly and possibly die. With proper preparation, often costing little or nothing extra to the project budget, trees can survive and thrive after construction. This is critical for tree survival because damage prevention is the single most effective treatment for trees on construction sites. Once trees are damaged, the treatment options available are limited.

The minimum Tree Protection Measures in *Attachment 4, Tree Protection Measures* are on three separate sheets that can be copied and introduced into all relevant documents such as site plans, permit applications and conditions of approval, and bid documents so that everyone involved is aware of the requirements. These Tree Protection Measures are intended to be generic in nature. They will need to be adjusted to the specific circumstances of your site that takes into account the location of improvements and the locations of the trees.

WAIVER OF LIABILITY

There are many conditions affecting a tree's health and stability, which may be present and cannot be ascertained, such as, root rot, previous or unexposed construction damage, internal cracks, stem rot and more which may be hidden. Changes in circumstances and conditions can also cause a rapid deterioration of a tree's health and stability. Adverse weather conditions can dramatically affect the health and safety of a tree in a very short amount of time. While I have used every reasonable means to examine these trees, this evaluation represents my opinion of the tree health at this point in time. These findings do not guarantee future safety nor are they predictions of future events.

The tree evaluation consists of an external visual inspection of an individual tree's root flare, trunk, and canopy from the ground only unless otherwise specified. The inspection may also consist of taking trunk or root soundings for sound comparisons to aid the

evaluator in determining the possible extent of decay within a tree. Soundings are only an aid to the evaluation process and do not replace the use of other more sophisticated diagnostic tools for determining the extent of decay within a tree.

As conditions change, it is the responsibility of the property owners to schedule additional site visits by the necessary professionals to ensure that the long-term success of the project is ensured. It is the responsibility of the property owner to obtain all required permits from city, county, state, or federal agencies. It is the responsibility of the property owner to comply with all applicable laws, regulations, and permit conditions. If there is a homeowners association, it is the responsibility of the property owner to comply with all Codes, Covenants, and Restrictions (CC&R's) that apply to tree pruning and tree removal.

This tree evaluation is to be used to inform and guide the client in the management of their trees. This in no way implies that the evaluator is responsible for performing recommended actions or using other methods or tools to further determine the extent of internal tree problems without written authorization from the client. Furthermore, the evaluator in no way holds that the opinions and recommendations are the only actions required to insure that the tree will not fail. A second opinion is recommended. The client shall hold the evaluator harmless for any and all injuries or damages incurred if the evaluator's recommendations are not followed or for acts of nature beyond the evaluator's reasonable expectations, such as severe winds, excessive rains, heavy snow loads, etc.

This report and all attachments, enclosures, and references, are confidential and are for the use of the client concerned. They may not be reproduced, used in any way, or disseminated in any form without the prior consent of the client concerned and Gilles Consulting.

Thank you for calling Gilles Consulting for your arboricultural needs.

Sincerely,

Brian K. Gilles, Consulting Arborist
ISA Certified Arborist # PN-0260A
ASCA Registered Consulting Arborist # RCA-418
ISA TRAQ Qualified
ISA TRAQ Certified Instructor

ATTACHMENTS

ATTACHMENT 1 - TOPOGRAPHIC SURVEY

ATTACHMENT 2 - TREE INVENTORY/CONDITIONS SPREADSHEET

ABBREVIATED LEGEND--SEE GLOSSARY IN REPORT ATTACHMENTS FOR GREATER DETAIL

#1 ***Property:*** Whether the tree is on or off the Subject Property, or a Right-of-Way tree.

#2 ***Tree Location:*** Relative placement of the tree on the Subject Property.

#3 ***Tree #:*** The unique tag number of each tree.

#4 ***Species:***

BCh/Pe	Bitter Cherry, *Prunus emarginata*
BLM/Am	Big Leaf Maple, *Acer macrophyllum*
DC/Cd	Deodar Cedar, *Cedrus deodara*
DF/Pm	Douglas Fir, *Pseudotsuga menziezii*
GS/Sg	Giant Sequoia, *Sequoiadendron giganteum*
HCn/Ah	Horse Chestnut, *Aesculus hippocastinatum*
MtnH/Tm	Mountain Hemlock, *Tsuga mertensiana*
PM/Am	Pacific Madrone, *Arbutus menziesii*
RA/Ar	Red Alder, *Alnus rubra*
SC/Cp	Sawara Cypress, *Chamaecyparis pisifera*
ScP/Ps	Scots Pine, *Pinus sylvestris*
WH/Th	Western Hemlock, *Tsuga heterophylla*
WRC/Tp	Western Red Cedar, *Thuja plicata*

#5 ***DBH:*** Trunk diameter @ 4.5' above average ground level.

#6 ***Tree Credit:*** This is based upon Table 95.35.1, Page 12, Chapter 95 of the Kirkland Municipal Code.

#7 ***Drip Line:*** The radius, the distance from the trunk to the furthest branch tips.

#8 ***Limits of Disturbance:*** The boundary between the area of minimum protection around a tree and the allowable site disturbance as determined by a qualified professional.

#9 ***LCR:*** *Live Crown Ratio* - the amount of live canopy expressed as a % of the entire tree height

#10 ***Symmetry:*** General shape of canopy and weight distribution of the tree around the trunk.

#11 ***Foliage:*** General description of foliage density that indicates tree health and vigor.

#12 ***Crown Condition:*** The most important external indication of tree health and vigor.

#13 ***Trunk:*** Description of trunk condition or abnormalities if any.

#14 ***Root Collar:*** The base of the tree where the trunk flares into the roots--deformities or problems are noted here.

#15 ***Roots:*** Root problems are noted here.

#16 ***Comments:*** Additional observations about the tree's condition.

#17 ***Significance:*** A "significant" tree is at least 6" in diameter measured at 4.5' above the average ground level.

#18 ***Current Health Rating:*** A description of health ranging from dead, dying, poor, fair, good, very good, to excellent.

#19 ***Viability***: A significant tree that is in good health with a low risk of failure due to structural defects, is relatively wind firm if isolated or remains as part of a grove, and is a species that is suitable for its location.

#20 ***Recommendation:*** An estimate of whether or not the tree is of sufficient health, vigor, and structure to consider retaining.

1	2	3	4		6	7	8 -- LIMITS OF DISTURBANCE				9	10	11	12	13	14	15	16	17	18	19	20
PROPERTY	TREE LOCATION	TREE #	SPECIES	DBH	TREE CREDIT	DRIP LINE	North	South	East	West	LCR	SYMMETRY	FOLIAGE	CROWN CONDITION	TRUNK	ROOT COLLAR	ROOTS	COMMENTS	SIGNIFICANCE	CURRENT HEALTH RATING	VIABILITY	RECOMMENDATION
Off property	West	701	GS/Sg	46.7"	0.0	20'	to driveway	to driveway	to driveway	to driveway	98%	Gen. Symm.	Dense	Healthy	Straight	NAD	Restricted	Growing in "V" between two driveways.	Significant	Excellent	Viable	Potential to retain with Tree Protection Measures
Off property	So. of drive way	702	GS/Sg	49.8"	0.0	20'	to driveway	n/a	20'	20'	98%	Gen. Symm.	Dense	Healthy	Straight	NAD	Restricted	Diameter is estimated.	Significant	Very good	Viable	Potential to retain with Tree Protection Measures

1	2	3	4		6	7	8 -- LIMITS OF DISTURBANCE				9	10	11	12	13	14	15	16	17	18	19	20
PROPERTY	TREE LOCATION	TREE #	SPECIES	DBH	TREE CREDIT	DRIP LINE	North	South	East	West	LCR	SYMMETRY	FOLIAGE	CROWN CONDITION	TRUNK	ROOT COLLAR	ROOTS	COMMENTS	SIGNIFICANCE	CURRENT HEALTH RATING	VIABILITY	RECOMMENDATION
Off property	So. of drive way	703	BLM/ Am	16.4"	0.0	16'	to driveway	16'	16'	16'	85 %	Min. Asym.	ABS/A SE	Regenerating - Average	Typical	NAD	Restricted	Base is app. 6 feet west of stream bank.	Significant	Good	Viable	Potential to retain with Tree Protection Measures
Off property	West	704	RA/Ar	24.1"	0.0	24'	to N. Prop. Line	24'	24'	24'	70 %	Gen. Symm.	PBS/P SE	Weak	Fork at 4.5', Center Rot	Base rot	Probable Root Rot	Decay extends up at least 18 feet. Fill on 40% of critical root zone. Carpenter ant infestation.	Significant	Poor	Non-viable	Contact and inform neighbor
Off property	West	705	RA/Ar	15.7"	0.0	16'	To N. Prop. Line	16'	16'	16'	70 %	Maj. Asym.	PBS/P SE	Weak	Fork at Base	NAD	Fill on 40%		Significant	Fair	Viable	Contact and inform neighbor
Off property	West	706	ScP/P s	15.8"	0.0	16'	An arc around the tree of 6 feet.				60 %	Maj. Asym.	Thin	Weak	Fork at base and Serpentine	Exposed	Fill on 40%	Fill against base. Two other trunks were cut off years ago and are now decayed. Decay extends down into the base and possibly the buttress roots.	Significant	Poor	Non-viable	Contact and inform neighbor
Off property	South	707	BCh/P e	16.0"	0.0	24'	An arc around the tree of 14'.				90 %	Gen. Symm.	ABS/A SE	Regenerating - Average	Fork at 4'	Probable Base Rot	-		Significant	Fair	Viable	Potential to retain with Tree Protection Measures
Off property	South	708	BLM/ Am	19.2"	0.0	22'	20'	To S. Prop. Line	To E. Prop. Line	12'	85 %	Maj. Asym.	PBS/P SE	Weak	Center rot	Base rot	Root Rot	Base is app. 3 feet east of east property line fence and shed. Tag stapled to fence. Dead branches in canopy. Stump sprouts.	Significant	Poor	Non-viable	Contact and inform neighbor
Off property	East	709	RA/Ar	16.4"	0.0	14'	14'	14'	To E. Prop. Line	5' W. of E. Prop. Line	85 %	Maj. Asym.	ABS/A SE	Average	fork at 13', Bowed	NAD	Restricted	Base is app. 6 feet east of east property line fence and 3 feet west of driveway. Tag on fence.	Significant	Fair	Viable	Potential to retain with Tree Protection Measures

1	2	3	4		6	7	8 -- LIMITS OF DISTURBANCE				9	10	11	12	13	14	15	16	17	18	19	20
PROPERTY	TREE LOCATION	TREE #	SPECIES	DBH	TREE CREDIT	DRIP LINE	North	South	East	West	LCR	SYMMETRY	FOLIAGE	CROWN CONDITION	TRUNK	ROOT COLLAR	ROOTS	COMMENTS	SIGNIFICANCE	CURRENT HEALTH RATING	VIABILITY	RECOMMENDATION
Off property	East	710	DF/Pm	32.0"	0.0	24'	24'	24'	To E. Prop. Line	5' W. of E. Prop. Line	95 %	Min. Asym.	Dense	Healthy	Straight	Exposed	-	Base is app. 1 feet east of east property line fence. Tag is on the fence. Sap flow on west side 13 feet to base--possible compression fracture not structural.	Significant	Very good	Viable	Potential to retain with Tree Protection Measures
Subject property	North east corner	711	DF/Pm	22.5"	7.0	20'	To ravine	20'	To E. Prop. Line	12'	80 %	Min. Asym.	Average	Healthy	Straight	Exposed	-	English Ivy infestation.	Significant	Good	Viable	Potential to retain with Tree Protection Measures
Subject property	North east corner	712	DF/Pm	25.8"	8.0	22'	To ravine	20'	To E. Prop. Line	12'	90 %	Maj. Asym.	Average	Average	Straight	NAD	-	English Ivy infestation.	Significant	Good	Viable	Potential to retain with Tree Protection Measures
Subject property	North east corner	713	DF/Pm	39.4"	15.0	32'	32'	32'	32'	32'	85 %	Min. Asym.	Chlorotic, Short shoot elongation	Weak	Straight	NAD	-	Carpenter Ant infestation. Woodpecker activity. Base is app. 6 feet east of shed hangers.	Significant	Fair	Viable	Potential to retain with Tree Protection Measures
Subject property	North east corner	714	PM/Am	25.8"	8.0	18'	18'	18'	18'	10'	50 %	Min. Asym.	Fusarium wilt in lower canopy	Healthy	leans east	NAD	-	English Ivy infestation.	Significant	Fair	Viable	Potential to retain with Tree Protection Measures
Subject property	North east corner	715	PM/Am	18.6"	5.0	18'	18'	18'	18'	20'	65 %	Min. Asym.	Average	Average	leans west	NAD	-	English Ivy infestation.	Significant	Fair	Viable	Potential to retain with Tree Protection Measures

1	2	3	4		6	7	8 -- LIMITS OF DISTURBANCE				9	10	11	12	13	14	15	16	17	18	19	20
PROPERTY	TREE LOCATION	TREE #	SPECIES	DBH	TREE CREDIT	DRIP LINE	North	South	East	West	LCR	SYMMETRY	FOLIAGE	CROWN CONDITION	TRUNK	ROOT COLLAR	ROOTS	COMMENTS	SIGNIFICANCE	CURRENT HEALTH RATING	VIABILITY	RECOMMENDATION
Subject property	North east corner	716	DF/Pm	35.2"	13.0	26'	26'	26'	26'	14'	75 %	Min. Asym.	Dense	Healthy	Straight	NAD	-	English Ivy infestation.	Significant	Good	Viable	Potential to retain with Tree Protection Measures
Subject property	North east corner	717	DF/Pm	40.0"	15.0	28'	28'	28'	28'	28'	70 %	Gen. Symm.	Average	Average	Straight	Ivy	English Ivy	Tag tied to the English Ivy on the south side. English Ivy infestation.	Significant	Good	Viable	Potential to retain with Tree Protection Measures
Subject property	North east corner	718	RA/Ar	16.3"	4.0	16'	n/a	Top of Ravine	16'	16'	30 %	Min. Asym.	ABS/ASE	Average	Leans north over road	Undermined by stream	Restricted	Base growing out of stream bank. English Ivy infestation.	Significant	Fair	Viable	Potential to retain with Tree Protection Measures
Subject property	North east corner	719	RA/Ar	11.2"	1.0	16'	n/a	16'	16'	16'	40 %	Min. Asym.	ABS/ASE	Average	Leans N over the road	Exposed	Restricted		Significant	Fair	Viable	Potential to retain with Tree Protection Measures
Subject property	North east corner	720	RA/Ar	8.9"	0.0	0'	n/a	n/a	n/a	n/a	0%	Maj. Asym.	None	Broken Out	Center rot	Base rot	-		Significant	Dead	Non-viable	Allow to Fall
Subject property	North east corner	721	RA/Ar	13.8"	2.0	18'	n/a	14'	14'	14'	40 %	Min. Asym.	ABS/ASE	Average	Leans N over the road	Exposed	-		Significant	Fair	Viable	Potential to retain with Tree Protection Measures
Subject property	North east corner	722	WRC/Tp	16.7"	4.0	16'	n/a	12'	16'	16'	10 2%	Gen. Symm.	Dense	Healthy	Straight	Exposed	-		Significant	Good	Viable	Potential to retain with Tree Protection Measures

1	2	3	4		6	7	8 -- LIMITS OF DISTURBANCE				9	10	11	12	13	14	15	16	17	18	19	20
PROPERTY	TREE LOCATION	TREE #	SPECIES	DBH	TREE CREDIT	DRIP LINE	North	South	East	West	LCR	SYMMETRY	FOLIAGE	CROWN CONDITION	TRUNK	ROOT COLLAR	ROOTS	COMMENTS	SIGNIFICANCE	CURRENT HEALTH RATING	VIABILITY	RECOMMENDATION
Subject property	North east corner	723	RA/Ar	8.7"	1.0	14'	n/a	12'	12'	12'	30 %	Maj. Asym.	Average	Weak	Leans N over the road	Exposed	-	Growing out of stream bank.	Significant	Fair	Viable	Potential to retain with Tree Protection Measures
Subject property	North east corner	724	BLM/ Am	12.8"	0.0	18'	n/a	n/a	n/a	n/a	75 %	Maj. Asym.	PBS/PSE	Weak	fork at base, Center Rot	Base rot	Root Rot	Trunk diameters are 6.9", 7.4", 4.3', & 6.8" = single trunk of 12.8 inches. Stump sprouts. English Ivy infestation.	Significant	Poor	Non-viable	Remove for safety
Subject property	North east corner	725	BLM/ Am	34.8"	0.0	8'	8'	8'	8'	8'	85 %	Min. Asym.	ABS/ASE	Average	Center rot	Exposed	Probable Root Rot	Base Rot.	Significant	Poor	Non-viable	Remove for safety
Subject property	North east corner	726	WRC/ Tp	30.4"	11.0	18'	to the creek	18'	18'	18'	99 %	Gen. Symm.	Dense	Healthy	Straight	NAD	-		Significant	Very good	Viable	Potential to retain with Tree Protection Measures
Subject property	North east corner	727	DF/Pm	44.6"	18.0	36'	36'	36'	36'	36'	85 %	Gen. Symm.	Dense	Healthy	Straight	NAD	-	English Ivy infestation.	Significant	Good	Viable	Potential to retain with Tree Protection Measures
Subject property	North east corner	728	DF/Pm	24.7"	8.0	24'	24'	24'	24'	24'	80 %	Min. Asym.	Average	Average	Straight	NAD	-	English Ivy infestation.	Significant	Fair	Viable	Potential to retain with Tree Protection Measures
Subject property	North east corner	729	HCn/Ah	12.0"	2.0	22'	to the road shoulder	14'	14'	14'	90 %	Maj. Asym.	ABS/ASE	Healthy	Fork at 4.5', Center Rot	Partially exposed	-	Base is 5 feet north of creek.	Significant	Good	Viable	Potential to retain with Tree Protection Measures

1	2	3	4		6	7	8 -- LIMITS OF DISTURBANCE				9	10	11	12	13	14	15	16	17	18	19	20
PROPERTY	TREE LOCATION	TREE #	SPECIES	DBH	TREE CREDIT	DRIP LINE	North	South	East	West	LCR	SYMMETRY	FOLIAGE	CROWN CONDITION	TRUNK	ROOT COLLAR	ROOTS	COMMENTS	SIGNIFICANCE	CURRENT HEALTH RATING	VIABILITY	RECOMMENDATION
Subject property	North east corner	730	RA/Ar	31.9"	11.0	26'	to the road shoulder	26'	26'	26'	70 %	Min. Asym.	ABS/ASE	Average	Fork at 3', Leans north over road	NAD	Restricted	Trunk diameters are 26.9" and 17.2" = single trunk of 31.9 inches. Base is at ordinary high water mark.	Significant	Fair	Viable	Potential to retain with Tree Protection Measures
Subject property	North east corner	731	RA/Ar	17.4"	4.0	18'	to the road shoulder	18'	18'	18'	60 %	Maj. Asym.	ABS/ASE	Average	Straight	Exposed	-	Base at ordinary high water mark.	Significant	Fair	Viable	Potential to retain with Tree Protection Measures
Subject property	North east corner	732	WRC/ Tp	32.8"	12.0	20'	20'	20'	20'	20'	98 %	Min. Asym.	Dense	Healthy	Fork at 5', straight	NAD	-	English Ivy infestation.	Significant	Very good	Viable	Potential to retain with Tree Protection Measures
Subject property	North east corner	733	WRC/ Tp	27.5"	9.0	18'	18'	18'	18'	18'	98 %	Gen. Symm.	Dense	Healthy	Straight	NAD	-	English Ivy infestation.	Significant	Good	Viable	Potential to retain with Tree Protection Measures
Subject property	North east corner	734	WRC/ Tp	32.7"	12.0	22'	22'	22'	22'	22'	98 %	Gen. Symm.	Dense	Healthy	Straight	NAD	Restricted	Next to gravel driveway.	Significant	Good	Viable	Potential to retain with Tree Protection Measures
Subject property	Between House and shed	735	MtnH/ Tm	10.1"	1.0	10'	10'	10'	10'	10'	92 %	Gen. Symm.	Dense	Regenerating - Average	Straight	NAD	-	Growing in small planter bed by front door of the house.	Significant	Very good	Viable	Potential to retain with Tree Protection Measures

1	2	3	4		6	7	8 -- LIMITS OF DISTURBANCE				9	10	11	12	13	14	15	16	17	18	19	20
PROPERTY	TREE LOCATION	TREE #	SPECIES	DBH	TREE CREDIT	DRIP LINE	North	South	East	West	LCR	SYMMETRY	FOLIAGE	CROWN CONDITION	TRUNK	ROOT COLLAR	ROOTS	COMMENTS	SIGNIFICANCE	CURRENT HEALTH RATING	VIABILITY	RECOMMENDATION
Subject property	West of House	736	DF/Pm	27.4"	9.0	22'	22'	22'	22'	22'	95 %	Gen. Symm.	Dense	Healthy	Straight	NAD	-		Significant	Excellent	Viable	Potential to retain with Tree Protection Measures
Subject property	West of House	737	SC/Cp	11.7"	1.0	12'	12'	12'	12'	12'	90 %	Maj. Asym.	Average	over topped	Fork at 4'	NAD	-		Significant	Fair	Viable	Potential to retain with Tree Protection Measures
Subject property	West of House	738	Unknown	7.7"	1.0	12'	12'	12'	12'	12'	80 %	Maj. Asym.	ABS/ASE	Average	fork at 3' with included bark	NAD	-		Significant	Fair	Viable	Potential to retain with Tree Protection Measures
Subject property	Above driveway	739	DF/Pm	23.2"	7.0	22'	to the driveway	To the S. Prop. Line	to the parking area		22'	65 %	Min. Asym.	Dense	Healthy	Straight	Ivy	-	Cluster above driveway near old gate.	Significant	Good	Viable	Potential to retain with Tree Protection Measures
Subject property	Above driveway	740	DF/Pm	29.3"	10.0	26'	to the driveway	To the S. Prop. Line	to the parking area		26'	70 %	Min. Asym.	Dense	Healthy	Straight	Ivy	-	Cluster above driveway near old gate.	Significant	Good	Viable	Potential to retain with Tree Protection Measures
Subject property	Above driveway	741	DF/Pm	17.5"	4.0	16'	to the driveway	To the S. Prop. Line	to the parking area		16'	70 %	Maj. Asym.	Dense	Healthy	Straight	Ivy	-	Cluster above driveway near old gate.	Significant	Good	Viable	Potential to retain with Tree Protection Measures

1	2	3	4		6	7	8 -- LIMITS OF DISTURBANCE				9	10	11	12	13	14	15	16	17	18	19	20
PROPERTY	TREE LOCATION	TREE #	SPECIES	DBH	TREE CREDIT	DRIP LINE	North	South	East	West	LCR	SYMMETRY	FOLIAGE	CROWN CONDITION	TRUNK	ROOT COLLAR	ROOTS	COMMENTS	SIGNIFICANCE	CURRENT HEALTH RATING	VIABILITY	RECOMMENDATION
Subject property	Above driveway	742	PM/Am	32.4"	12.0	26'	to the driveway	To the S. Prop. Line	to the parking area	26'	50 %	Min. Asym.	Fusarium wilt in lower canopy	Average	leans south	Ivy	-	Growing above driveway near old gate.	Significant	Fair	Viable	Potential to retain with Tree Protection Measures
Subject property	Above driveway	743	DF/Pm	30.2"	11.0	22'	to the driveway	22'	22'	22'	60 %	Min. Asym.	Average	Healthy	Straight	Ivy	Restricted	English Ivy infestation.	Significant	Fair	Viable	Potential to retain with Tree Protection Measures
Subject property	Above driveway	744	DF/Pm	32.4"	12.0	24'	to the driveway	24'	24'	24'	80 %	Min. Asym.	Dense	Healthy	Straight	Ivy	Restricted	English Ivy infestation.	Significant	Good	Viable	Potential to retain with Tree Protection Measures
Subject property	Above driveway	745	BLM/Am	11.6"	1.0	20'	to the driveway	20'	20'	20'	90 %	Gen. Symm.	ABS/ASE	Healthy	Straight	NAD	Restricted		Significant	Fair	Viable	Potential to retain with Tree Protection Measures
Subject property	Above driveway	746	BLM/Am	20.5"	6.0	34'	to the driveway	34'	34'	34'	80 %	Maj. Asym.	ABS/ASE	Average	Typical	NAD	Restricted		Significant	Fair	Viable	Potential to retain with Tree Protection Measures
Subject property	Above driveway	747	BLM/Am	16.8"	4.0	28'	to the driveway	28'	28'	28'	80 %	Maj. Asym.	ABS/ASE	Average	Typical	NAD	Restricted		Significant	Good	Viable	Potential to retain with Tree Protection Measures

1	2	3	4		6	7	8 -- LIMITS OF DISTURBANCE				9	10	11	12	13	14	15	16	17	18	19	20
PROPERTY	TREE LOCATION	TREE #	SPECIES	DBH	TREE CREDIT	DRIP LINE	North	South	East	West	LCR	SYMMETRY	FOLIAGE	CROWN CONDITION	TRUNK	ROOT COLLAR	ROOTS	COMMENTS	SIGNIFICANCE	CURRENT HEALTH RATING	VIABILITY	RECOMMENDATION
Subject property	Between Driveway and Road	748	BLM/ Am	10.3"	1.0	20'	20'	20'	20'	20'	65 %	Maj. Asym.	ABS/A SE	Average	Fork at 1', Typical	NAD	Restricted	Trunk diameters are 9.9" & 5.2" = single trunk tree of 10.3 inches. Base is app. 2 feet north of gravel driveway.	Significant	Fair	Viable	Potential to retain with Tree Protection Measures
Subject property	Between Driveway and Road	749	WRC/ Tp	27.8"	9.0	18'	n/a	to driveway	18'	18'	98 %	Gen. Symm.	Average	Average	Straight	NAD	Restricted	Base is app. 3 feet north of gravel driveway. Heavy outer bark harvesting by squirrels.	Significant	Good	Viable	Potential to retain with Tree Protection Measures
Subject property	Between Driveway and Road	750	BLM/ Am	16.1"	0.0	18'	18'	18'	18'	18'	65 %	Maj. Asym.	ABS/A SE	Average	Center rot	Base rot	Root Rot	Carpenter ant infestation.	Significant	Poor	Non-viable	Remove for safety
Subject property	Between Driveway and Road	751	WRC/ Tp	25.4"	8.0	18'	n/a	to driveway	18'	18'	98 %	Gen. Symm.	Average	Average	Straight	NAD	-		Significant	Good	Viable	Potential to retain with Tree Protection Measures
Subject property	Between Driveway and Road	752	WRC/ Tp	7.2"	1.0	7'	7'	7'	7'	7'	25 %	Min. Asym.	Thin	Average	slight lean N	NAD	-	Trunk sweeps north.	Significant	Fair	Viable	Potential to retain with Tree Protection Measures
Subject property	Between Driveway and Road	753	WRC/ Tp	32.7"	12.0	20'	n/a	to driveway	20'	20'	94 %	Min. Asym.	Average	Healthy	fork at 18'	NAD	Restricted	Open wound south side base up 3.5 feet.	Significant	Good	Viable	Potential to retain with Tree Protection Measures

1	2	3	4		6	7	8 -- LIMITS OF DISTURBANCE				9	10	11	12	13	14	15	16	17	18	19	20
PROPERTY	TREE LOCATION	TREE #	SPECIES	DBH	TREE CREDIT	DRIP LINE	North	South	East	West	LCR	SYMMETRY	FOLIAGE	CROWN CONDITION	TRUNK	ROOT COLLAR	ROOTS	COMMENTS	SIGNIFICANCE	CURRENT HEALTH RATING	VIABILITY	RECOMMENDATION
Subject property	Between Driveway and Road	754	WRC/ Tp	6.2"	1.0	9'	9'	9'	9'	9'	75 %	Maj. Asym.	Average	Average	Leans N, Center Rot	Base rot	Probable Root Rot		Significant	Fair	Viable	Potential to retain with Tree Protection Measures
Subject property	Between Driveway and Road	755	RA/Ar	25.0"	8.0	20'	n/a	to driveway	20'	20'	85 %	Maj. Asym.	ABS/ASE	Average	Leans NW	Undermined by stream	Restricted	Growing out of stream bank. Tag tied to branches of 754.	Significant	Fair	Viable	Potential to retain with Tree Protection Measures
Subject property	Between Driveway and Road	756	RA/Ar	14.8"	3.0	16'	n/a	to driveway	16'	16'	85 %	Maj. Asym.	ABS/ASE	Average	Leans N	NAD	Restricted		Significant	Fair	Viable	Potential to retain with Tree Protection Measures
Subject property	Between Driveway and Road	757	BLM/ Am	34.8"	13.0	32'	n/a	to driveway	32'	32'	60 %	Maj. Asym.	ABS/ASE	Average	Fork at 5' w/ included bark	NAD	Restricted	Growing just above high water mark.	Significant	Good	Viable	Potential to retain with Tree Protection Measures
Subject property	Between Driveway and Road	758	WH/Th	19.4"	5.0	0'	n/a	n/a	n/a	n/a	0%	n/a	None	Dead	Center rot	Base rot	Root Rot	Still has small twigs indicating recent death.	Significant	Dead	Non-viable	Remove for safety
Subject property	Between Driveway and Road	759	WRC/ Tp	13.2"	2.0	16'	16'	16'	16'	16'	90 %	Gen. Symm.	Dense	Healthy	Straight	Partially exposed	Restricted		Significant	Very good	Viable	Remove for safety

1	2	3	4		6	7	8 -- LIMITS OF DISTURBANCE				9	10	11	12	13	14	15	16	17	18	19	20
PROPERTY	TREE LOCATION	TREE #	SPECIES	DBH	TREE CREDIT	DRIP LINE	North	South	East	West	LCR	SYMMETRY	FOLIAGE	CROWN CONDITION	TRUNK	ROOT COLLAR	ROOTS	COMMENTS	SIGNIFICANCE	CURRENT HEALTH RATING	VIABILITY	RECOMMENDATION
Subject property	Between Driveway and Road	760	WH/Th	22.9"	7.0	0'	n/a	n/a	n/a	n/a	0%	n/a	None	Dead	Center rot	Base rot	Root Rot	Broken off at app. 60 feet. Carpenter Ant infestation. Woodpecker activity.	Significant	Dead	Non-viable	Remove for safety
Subject property	Between Driveway and Road	761	WRC/Tp	18.3"	5.0	18'	n/a	to driveway	18'	18'	100%	Min. Asym.	Dense	Healthy	Slight lean NW	Partially exposed	Restricted		Significant	Dead	Non-viable	Remove for safety
Subject property	Between Driveway and Road	762	WRC/Tp	21.7"	6.0	18'	n/a	to driveway	18'	18'	94%	Min. Asym.	Average	Average	Serpentine	Partially exposed	Restricted		Significant		Non-viable	Potential to retain with Tree Protection Measures
Subject property	Between Driveway and Road	763	WRC/Tp	32.2"	12.0	20'	n/a	to driveway	20'	20'	96%	Min. Asym.	Dense	Healthy	slight Lean N, Fork at 9'	NAD	Restricted	Growing at edge of stream.	Significant		Non-viable	Potential to retain with Tree Protection Measures
Subject property	Between Driveway and Road	764	WRC/Tp	59.0"	21.0	24'	n/a	to driveway	24'	24'	98%	Gen. Symm.	Dense	Healthy	fork at 4.5'	NAD	Restricted		Significant			Potential to retain with Tree Protection Measures
Subject property	Between Driveway and Road	765	ScP/Ps	14.4"	3.0	16'	n/a	to driveway	16'	16'	94%	Min. Asym.	Average	Regenerating - Average	Slightly serpentine	NAD	Restricted	Base is app. 8' NE of driveway.	Significant			Potential to retain with Tree Protection Measures

1	2	3	4		6	7	8 -- LIMITS OF DISTURBANCE				9	10	11	12	13	14	15	16	17	18	19	20
PROPERTY	TREE LOCATION	TREE #	SPECIES	DBH	TREE CREDIT	DRIP LINE	North	South	East	West	LCR	SYMMETRY	FOLIAGE	CROWN CONDITION	TRUNK	ROOT COLLAR	ROOTS	COMMENTS	SIGNIFICANCE	CURRENT HEALTH RATING	VIABILITY	RECOMMENDATION
Subject property	Between Driveway and Road	766	DC/Dc	22.8"	7.0	24'	n/a	to driveway	24'	24'	94 %	Gen. Symm.	Dense	Regenerating - Average	Straight	NAD	Restricted	Surface roots.	Significant			Potential to retain with Tree Protection Measures
Subject property	Near SE Property Corner	767	BLM/ Am	27.4"	9.0	36'	n/a	to driveway	36'	36'	70 %	Min. Asym.	ABS/A SE	Average	Fork at 7', Typical	Partially exposed	Surface	Dead branches in canopy.	Significant			Potential to retain with Tree Protection Measures
					382.0	**Total number of tree credits on the property at this time.**																

ATTACHMENT 3 - GLOSSARY

Terms Used in This Report, on the Tree Condition / Inventory Spreadsheet, and Their Significance

In an effort to clearly present the information for each tree in a manner that facilitates the reader's ability to understand the conclusions I have drawn for each tree, I have collected the information in a spreadsheet format. This spreadsheet was developed by Gilles Consulting based upon the *Tree Risk Assessment in Urban Areas and the Urban/Rural Interface* course manual and the *Tree Risk Assessment Form*, both sponsored by the Pacific Northwest Chapter of the International Society of Arboriculture, and the *Hazard Tree Evaluation Form* from the book, *The Evaluation of Hazard Trees in Urban Areas*, by Matheny and Clarke. The descriptions were left brief on the spreadsheet in an effort to include as much pertinent information as possible, to make the report manageable, and to avoid boring the reader with infinite levels of detail. However, a review of these terms and descriptions will allow the reader to rapidly move through the report and understand the information.

1) **PROPERTY**—Whether the tree is on or off the Subject Property, or a Right-of-Way tree.
2) **TREE LOCATION**—Relative placement of the tree.
3) **TREE #**—the unique tag number of each tree.
4) **SPECIES**—this describes the species of each tree with both most readily accepted common name and the officially accepted scientific name.
5) **DBH**—Diameter Breast Height. This is the standard measurement of trees taken at 4.5 feet above the average ground level of the tree base.
    i) Occasionally it is not practical to measure a tree at 4.5 feet above the ground. The most representative area of the trunk near 4.5 feet is then measured and noted on the spreadsheet. For instance, a tree that forks at 4.5 feet can have an unusually large swelling at that point. The measurement is taken below the swelling and noted, e.g. '28.4" at 36"'.
    ii) Trees with multiple stems are listed as a "clump of x," with x being the number of trunks in the clump. Measurements may be given as an average of all the trunks, or individual measurements for each trunk may be listed.
        (1) Every effort is made to distinguish between a single tree with multiple stems and several trees growing close together at the bases.
6) **TREE CREDIT**—Tree Credit based on Trunk Diameter
7) **DRIP LINE**— the radius, the distance from the trunk to the furthest branch tips.
8) **LIMITS OF DISTURBANCE**— The boundary between the area of minimum protection around a tree and the allowable site disturbance as determined by a qualified professional. Distances from the center of the trunk were derived on a case by case basis looking at the unique circumstances of each property and each tree on that property.

9) **% LCR**—Percentage of Live Crown Ratio. The relative proportion of green crown to overall tree height. This is an important indication of a tree's health. If a tree has a high percentage of Live Crown Ratio, it is likely producing enough photosynthetic activity to support the tree. If a tree has less than 30% to 40% LCR, it can create a shortage of needed energy and can indicate poor health and vigor.
10) **SYMMETRY**—is the description of the form of the canopy, i.e., the balance or overall shape of the canopy and crown. This is the place I list any major defects in the canopy shape, e.g. does the tree have all its foliage on one side or in one unusual area? Symmetry can be important if there are additional defects in the tree such as rot pockets, cracks, loose roots, weak crown, etc. Symmetry is generally categorized as Generally Symmetrical, Minor Asymmetry or Major Asymmetry:
    i) Gen. Sym.—Generally Symmetrical. The canopy/foliage is generally even on all sides with spacing of scaffold branches typical for the species, both vertically and radially.
    ii) Min. Asym.—Minor Asymmetry. The canopy/foliage has a slightly irregular shape with more weight on one side, but appears to be no problem for the tree.
    iii) Maj. Asym.—Major Asymmetry. The canopy/foliage has a highly irregular shape for the species with the majority of the weight on one side of the tree. This can have a significant impact on the tree's stability, health and hazard potential—especially if other defects are noted such as cracks, rot, or root defects.
11) **FOLIAGE/BRANCH**—describes the foliage of the tree in relation to a perfect specimen of that particular species. First the branch growth and foliage density is described, and then any signs or symptoms of stress and/or disease are noted. The condition of the foliage, or the branches and buds for deciduous trees in the dormant season, are important indications of a tree's health and vigor.
    i) For Deciduous trees in the dormant season:
        (1) The structure of the deciduous tree is visible.
        (2) The quantity and quality of buds indicates health, and is described as good bud set, average bud set, or poor bud set. These are abbreviated in the spreadsheet as: gbs, abs, or pbs.
        (3) The amount of annual shoot elongation is visible and is another major indication of tree health and vigor. This is described as:
            a) Excellent, Good, Average, or Short Shoot Elongation. These are abbreviated in the spreadsheet as ESE, GSE, ASE, or SSE.
    ii) For evergreen trees year round and deciduous trees in leaf, the color and density of the foliage indicates if the tree is healthy or stressed, or if an insect infestation, a bacterial, fungal, or viral infection is present. Foliage is categorized on a scale from:
        (1) Dense—extremely thick foliage, an indication of healthy vigorous growth,
        (2) Good—thick foliage, thicker than average for the species,

(3) Normal/Average—thick foliage, average for the species, an indication of healthy growth,
(4) Thin or Thinning—needles and leaves becoming less dense so that sunlight readily passes through; an indication that the tree is under serious stress that could impact the long-term survivability and safety of the tree,
(5) Sparse—few leaves or needles on the twigs, an indication that the tree is under extreme stress and could indicate the future death of the tree,
(6) Necrosis—the presence of dead twigs and branchlets. This is another significant indication of tree health. A few dead twigs and branches are reasonably typical in most trees of size. However, if there are dead twigs and branchlets all over a certain portion of the tree, or all over the tree, these are indications of stress or attack that can have an impact on the tree's long-term health.
(7) Hangers—a term to describe a large branch or limb that has broken off but is still hanging up in the tree. These can be particularly dangerous in adverse weather conditions.

12) **CROWN CONDITION**—the crown is uppermost portion of the tree, generally considered the top 10 to 20% of the canopy or that part of the canopy above the main trunk in deciduous trees and above the secondary bark in evergreen trees.
   i) The condition of the tree's crown is a reflection of the overall health and vigor of the entire tree. The crown is one of the first places a tree will demonstrate stress and pathogenic attack such as root rot.
   ii) If the **Crown Condition** is healthy and strong, this is a good sign. If the crown condition is weak, broken out, or shows other signs of decline, it is an indication that the tree is under stress. It is such an important indication of health and vigor that this is the first place a trained forester or arborist looks to begin the evaluation of a tree. Current research reveals that, by the time trees with root rot show significant signs of decline in the crown, fully 50% or more of the roots have already rotted away. **Crown Condition** can be described as:
      (1) Healthy Crown—exceptional growth for the species.
      (2) Average Crown—typical for the species.
      (3) Weak Crown—thin spindly growth with thin or sparse needles.
      (4) Flagging Crown—describes a tree crown that is weak and unable to grow straight up.
      (5) Dying Crown—describes obvious decline that is nearing death.
      (6) Dead Crown—the crown has died due to pathological or physical injury. The tree is considered to have significant stress and/or weakness if the crown is dead.
      (7) Broken out—a formerly weak crown condition that has been broken off by adverse weather conditions or other mechanical means.

(8) Regenerated or Regenerating—formerly broken out crowns that are now growing back. Regenerating crowns may appear healthy, average, or weak and indicate current health of the tree.

(9) Suppressed—a term used to describe poor condition of an entire tree or just the crown. Suppressed crowns are those that are entirely below the general level of the canopy of surrounding trees which receive no direct sunlight. They are generally in poor health and vigor. Suppressed trees are generally trees that are smaller and growing in the shade of larger trees around them. They generally have thin or sparse needles, weak or missing crowns, and are prone to insect attack as well as bacterial and fungal infections.

13) **TRUNK**—this is the area to note any defects that can have an impact on the tree's stability or hazard potential. Typical things noted are:

i) FORKED—bifurcation of branches or trunks that often occur at a narrow angle.

ii) INCLUDED BARK—a pattern of development at branch or trunk junctions where bark is turned inward rather than pushed out. This can be a serious structural defect in a tree that can and often does lead to failure of one or more of the branches or trunks, especially during severe, adverse weather conditions.

iii) EPICORMIC GROWTH—this is generally seen as dense thick growth near the trunk of a tree. Although this looks like a healthy condition, it is, in fact the opposite. Trees with Epicormic Growth have used their reserve stores of energy in a last ditch effort to produce enough additional photosynthetic surface area to produce more sugars, starches and carbohydrates to support the continued growth of the tree. Generally speaking, when conifers in the Pacific Northwest exhibit heavy amounts of Epicormic Growth, they are not producing enough food to support their current mass and are already in serious decline.

iv) INTERNAL STRUCTURAL WEAKNESS—a physical characteristic of the tree trunk, such as a **kink, crack, rot pocket, or rot column** that predisposes the tree trunk to failure at the point of greatest weakness.

v) BOWED—a gradual curve of the trunk. This can indicate an Internal Structural Weakness or an overall weak tree. It can also indicate slow movement of soils or historic damage of the tree that has been corrected by the curved growth.

vi) KINKED—a sharp angle in the tree trunk that indicates that the normal growth pattern is disrupted. Generally this means that the internal fibers and annual rings are weaker than straight trunks and prone to failure, especially in adverse weather conditions.

vii) GROUND FLOWER—an area of deformed bark near the base of a tree trunk that indicates long-term root rot.

14) **ROOT COLLAR**—this is the area where the trunk enters the soil and the buttress roots flare out away from the trunk into the soil. It is here that signs of rot, decay, insect infestation, or fungal or bacterial infection are noted. **NAD** stands for **N**o **A**pparent **D**efects.
15) **ROOTS**—any abnormalities such as girdling roots, roots that wrap around the tree itself that strangle the cambium layer and kill the tree, are noted here.
16) **COMMENTS**—this is the area to note any additional information that would not fit in the previous boxes or attributes about the tree that have bearing on the health and structure of the tree.
17) **SIGNIFICANCE**—a "significant" tree is at least 6" in diameter measured at 4.5' above the average ground level.
18) **CURRENT HEALTH RATING**— a description of general health ranging from dead, dying, poor, senescent, suppressed, fair, good, very good, to excellent.
19) **VIABILITY—** a significant tree that is in good health with a low risk of failure due to structural defects, is relatively wind firm if isolated or remains as part of a grove, and is a species that is suitable for its location.
    (1) Please note that many trees may be listed as "Non-Viable" due to poor health, poor structure, or the tree may be below the size threshold for a "Viable Tree." However, it is worth examining the Non-Viable Trees to determine if any or all of them can be left on the property. They can add significant benefit to the landscape and contribute to wildlife habitat.
20) **RECOMMENDATION**— this is an estimate of whether or not the tree is of sufficient health, vigor, and structure that it is worth retaining. Specific recommendations for each tree are included in this column. They may include anything from pruning dead wood, mulching, aerating, injecting tree-based fertilizer into the root system, shortening into a habitat tree or wildlife snag, or to completely removing the tree.
    i) **Monitor: "**Monitor" is a specific recommendation that the tree be re-evaluated on a routine basis to determine if there are any significant changes in health or structural stability. "Monitor annually" (or bi-annually, tri-annually, etc.)" means the tree should be looked at once every year (or every 2 or 3 years, etc.) This yearly monitoring can be a quick look at the trees to see if there are any significant changes. Significant changes such as storm damage, loss of crown, partial failure of one or more roots, etc. require that a full evaluation be done of the tree at that time.
    ii) **Potential to retain with tree protection measures:** means that the tree appears to have the internal resources, the health and vigor, structural stability, and the wind firmness to be able to withstand the stresses of construction if development requirements and construction requirements allow.
    iii) **Habitat or Remove:** means that the tree has a high potential to fail and cause either personal injury or property damage—in other words the tree has been declared a hazard tree and should be dealt with prior to the next large storm.

If it is at all possible the recommendation is to leave some of the trunk standing for wildlife habitat and some of the trunk on the ground as a nurse log. The height of the standing habitat tree depends upon the size of the tree, the condition of the tree, and the distance to a probable target. It should be short enough so that when it does fail years in the future it will not cause personal injury or property damage. Nurse logs can be laid horizontally across the slope to aid with erosion control and to provide microenvironments for new plantings. The nurse logs meaning to be steak to prevent their movement and potential harm to people. If for some reason this is not possible that should be removed for safety.

NOTE: TREES WITH THE SAME DESCRIPTION AND DIFFERENT RATINGS: Two trees may have the same descriptions in the matrix boxes, one may be marked "Significant," while another may be marked "Non-Significant." The difference is in the degree of the description, i.e., "early necrosis" versus "advanced necrosis" for instance. Another example is "center rot" or 'base rot". In a Western Red Cedar tree, the presence of low or even moderate rot is not significant and does not diminish the strength of the tree. However, low levels of rot in the base of a Douglas Fir tree, in an area known to have virulent pathogens present, is highly significant and predisposes that tree to windthrow.

ATTACHMENT 4 - TREE PROTECTION MEASURES

In order for trees to survive the stresses placed upon them in the construction process, tree protection must be planned in advance of equipment arrival on site. If tree protection is not planned integral with the design and layout of the project, the trees will suffer needlessly and will possibly die. With proper preparation, often costing little, or nothing extra to the project budget, trees can survive and thrive after construction. This is critical for tree survival because damage prevention is the single most effective treatment for trees on construction sites. Once trees are damaged, the treatment options available are limited.

The following minimum Tree Protection Measures are included on three separate sheets so that they can be copied and introduced into all relevant documents such as site plans, permit applications and conditions of approval, and bid documents so that everyone involved is aware of the requirements. These Tree Protection Measures are intended to be generic in nature. They will need to be adjusted to the specific circumstances of your site that takes into account the location of improvements and the locations of the trees.

TREE PROTECTION MEASURES:

1. Tree Protection Fences will need to be placed around each tree or group of trees to be retained.
    a. Tree Protection Fences are to be placed according to the attached drawing and as noted in the attached Tree Inventory/Conditions Spreadsheet, Column 6 - Limits of Disturbance.
    b. Tree Protection Fences must be inspected prior to the beginning of any construction work/activities.
    c. Nothing must be parked or stored within the Tree Protection Fences—no equipment, vehicles, soil, debris, or construction supplies of any sorts.

2. Cement trucks must not be allowed to deposit waste or wash out materials from their trucks within the Tree Protection Fences.

3. The Tree Protection Fences need to be clearly marked with the following or similar text in four inch or larger letters:

TREE PROTECTION AREA, ENTRANCE PROHIBITED
To report violations contact
City Code Enforcement at
425-587-3225

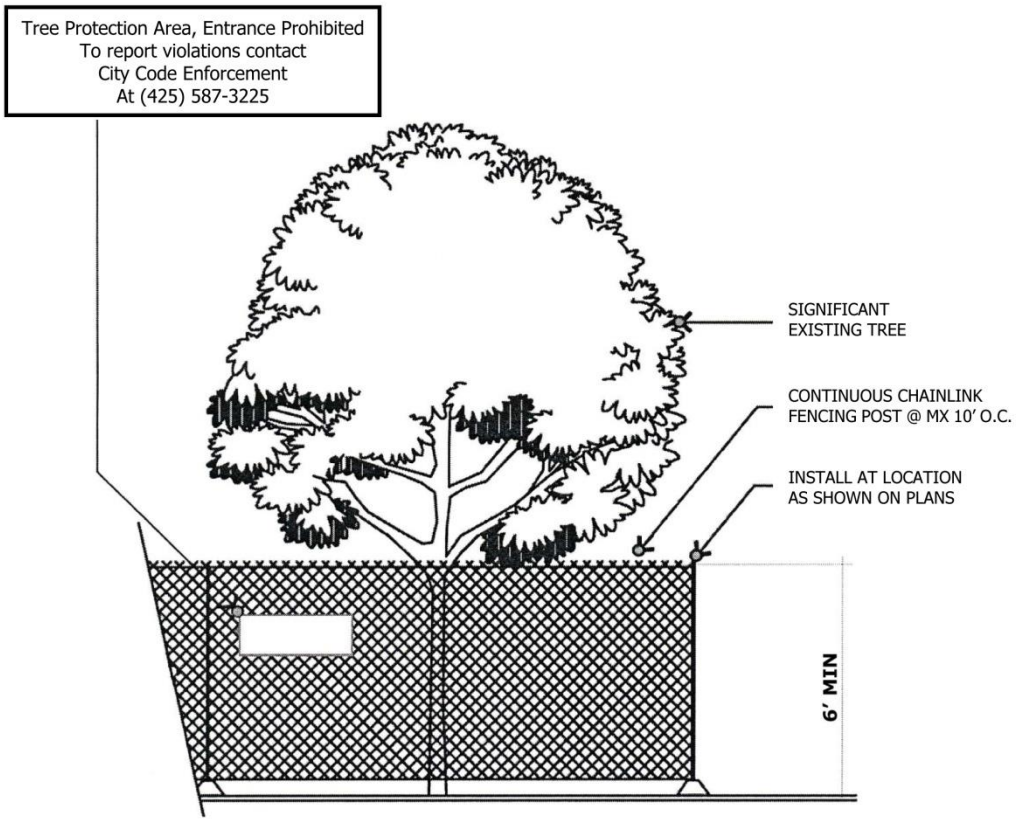
4. The area within the Tree Protection Fencing must be covered with wood chips, hog fuel, or similar materials to a depth of 8 to 10 inches. The materials should be placed prior to beginning construction and remain until the Tree Protection Fencing is taken down.

5. When excavation occurs near trees that are scheduled for retention, the following procedure must be followed to protect the long term survivability of the tree:
    a. An International Society of Arboriculture, (ISA) Certified Arborist must be working with all equipment operators.
        i. The Certified Arborist should be outfitted with a shovel, hand pruners, a pair of loppers, a handsaw, and a power saw (a "sawsall" is recommended).
    b. The hoe must be placed to "comb" the material directly away from the trunk as opposed to cutting across the roots.
        i. Combing is the gradual excavation of the ground cover plants and soil in depths that only extend as deep as the tines of the hoe.
    c. When any roots of one inch diameter or greater, of the tree to be retained, is struck by the equipment, the Certified Arborist should stop the equipment operator.
    d. The Certified Arborist should then excavate around the tree root by hand/shovel and cleanly cut the tree root.

i. The Certified Arborist should then instruct the equipment operator to continue.

6. Putting Utilities Under the Root Zone:
    a. Boring under the root systems of trees (and other vegetation) shall be done under the supervision of an ISA Certified Arborist. This is to be accomplished by excavating a limited trench or pit on each side of the critical root zone of the tree and then hand digging or pushing the pipe through the soil under the tree. The closest pit walls shall be a minimum of 7 feet from the center of the tree and shall be sufficient depth to lay the pipe at the grade as shown on the plan and profile.
    b. Tunneling under the roots of trees shall be done under the supervision of an ISA Certified Arborist in an open trench by carefully excavating and hand digging around areas where large roots are exposed. No roots 1 inch in diameter or larger shall be cut.
    c. The contractor shall verify the vertical and horizontal location of existing utilities to avoid conflicts and maintain minimum clearances; adjustment shall be made to the grade of the new utility as required.

7. Watering:
    a. The trees will require significant watering throughout the summer and early fall in order to survive long-term. An easy and economical watering can be done using soaker hoses placed three feet from the trunk of the tree and spiraled around the tree. One 75-foot soaker hose per tree is adequate. It is best to place the soakers using landscape staples, (available from HD Fowler in Bellevue for pennies apiece) then cover the area with two to three inches composed materials. The composted material will act as a mulch to minimize evaporation and will also stimulate the microbial activity of the soil which is another benefit to the health of the tree.
    b. Water the tree to a depth of 18 to 20 inches. I recommended leaving the water on the soaker hoses for six to eight hours and then digging down to determine how deep your water is penetrating. Then adjust accordingly. It may take a good two days of watering to reach the proper depth.
    c. Once the water reaches the proper depth, turn off the hoses for four weeks and then water again. Water more often when temperatures increase—every three weeks when temperatures exceed 80 degrees and every two weeks when temperatures exceed 90 degrees. This drying out of the soil in between watering is important to prevent soil pathogens from attacking the trees.



1. MINIMUM SIX (6) FOOT HIGH TEMPORARY CHAINLINK FENCE SHALL BE PLACED AT THE CRITICAL ROOT ZONE OR DESIGNATED LIMIT OF DISTURBANCE OF THE TREE TO BE SAVED. FENCE SHALL COMPLETELY ENCIRCLE TREE(S). INSTALL FENCE POSTS USING PIER BLOCK ONLY. AVOID POST OR STAKES INTO MAJOR ROOTS. MODIFICATIONS TO FENCING MATERIAL AND LOCATION MUST BE APPROVED BY PLANNING OFFICIAL.

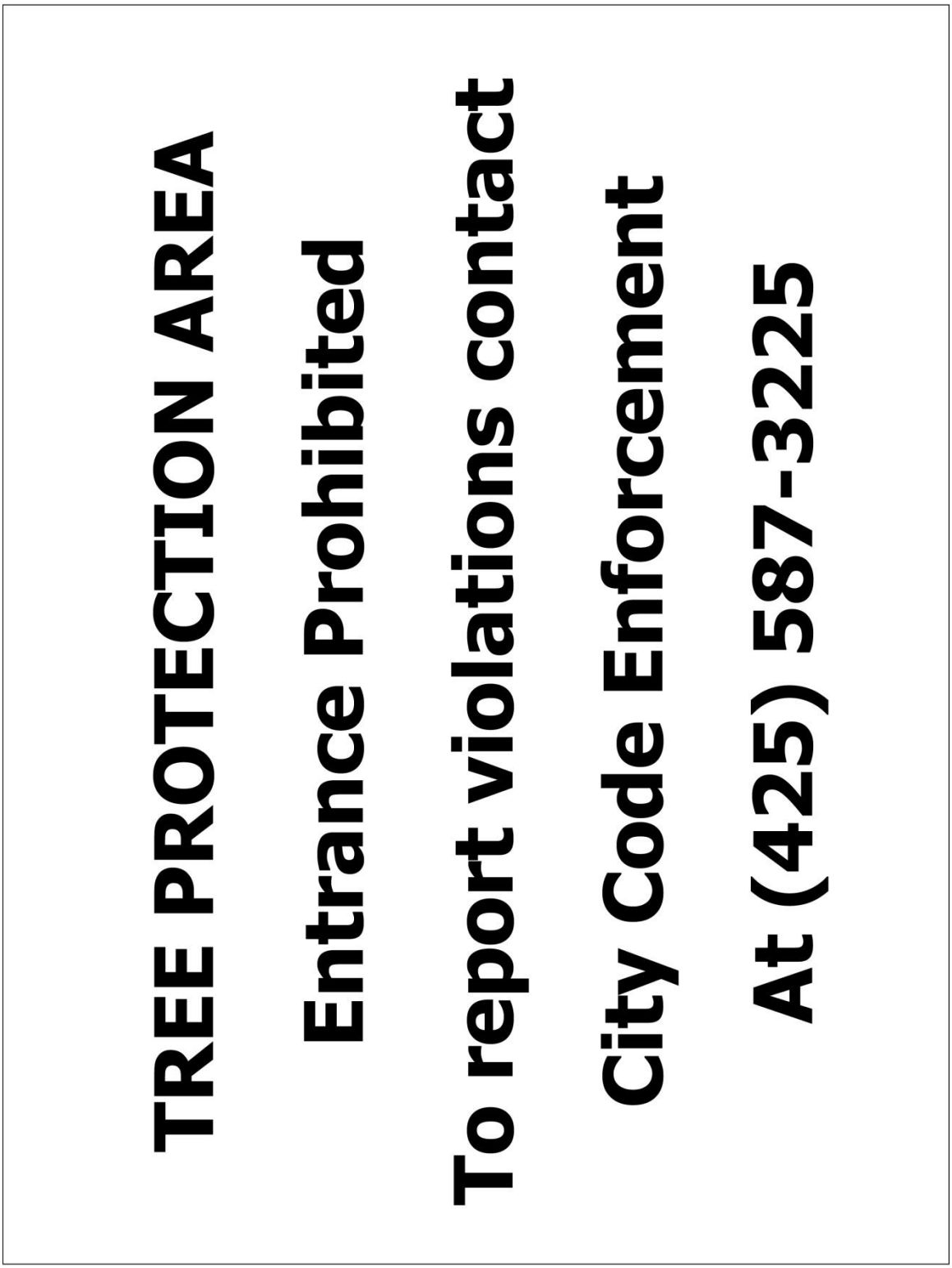
2. TREATMENT OF ROOTS EXPOSED DURING CONSTRUCTION: FOR ROOTS OVER ONE (1) INCH DIAMETER DAMAGED DURING CONSTRUCTION, MAKE A CLEAN STRAIGHT CUT TO REMOVE DAMAGED PORTION OF ROOT. ALL EXPOSED ROOTS SHALL BE TEMPORARILY COVERED WITH DAMP BURLAP TO PREVENT DRYING AND COVERED WITH SOIL AS SOON AS POSSIBLE.

3. NO STOCKPILING OF MATERIALS, VEHICULAR TRAFFIC, OR STORAGE OF EQUIPMENT OR MACHINERY SHALL BE ALLOWED WITHIN THE LIMIT OF THE FENCING. FENCING SHALL NOT BE MOVED OR REMOVED UNLESS APPROVED BY THE CITY PLANNING OFFICIAL. WORK WITHIN PROTECTION FENCE SHALL BE DONE MANUALLY UNDER THE SUPERVISION OF THE ON-SITE ARBORIST AND WITH PRIOR APPROVAL BY THE CITY PLANNING OFFICIAL.

4. FENCING SIGNAGE AS DETAILED ABOVE MUST BE POSTED EVERY FIFTEEN (15) FEET ALONG THE FENCE.

CITY OF KIRKLAND WASHINGTON

TREE PROTECTION FENCING DETAIL
(for public and private trees)


TREE PROTECTION AREA
Entrance Prohibited
To report violations contact
City Code Enforcement
At (425) 587-3225

ATTACHMENT 5 - REFERENCES

1. Dirr, Michael A. *Manual of Woody Landscape Plants, Their Identification, Ornamental Characteristics, Culture, Propagation, and Uses*. Champaign: Stipes Publishing Company, 1990.

2. Harris, Richard W, James Clark, and Nelda Matheny. *Arboriculture, Integrated Management of Landscape Trees, Shrubs, and Vines*. 4th ed. Upper Saddle River: Prentice Hall, 2004.

3. Matheny, Nelda P. and Clark, James R. *Evaluation of Hazard Trees*. 2nd ed. Savoy: The International Society of Arboriculture Press, 1994.

4. Matheny, Nelda P. and Clark, James R. *Trees & Development, A Technical Guide to Preservation of Trees During Land Development*. Savoy: The International Society of Arboriculture Press, 1998.

5. Mathews, Daniel. *Cascade -- Olympic Natural History*. Portland, Oregon: Raven Editions with the Portland Audubon Society, 1992.

6. Mattheck, Claus and Breloer, Helge. *The Body Language of Trees, A Handbook for Failure Analysis*. London: HMSO, 1994.

7. Pacific Northwest Chapter-ISA. *Tree Risk Assessment in Urban Areas and the Urban/Rural Interface.* Course Manual. Release 1.5. PNW-ISA: Silverton, Oregon, 2011.

8. Scharpf, Robert F. *Diseases of Pacific Coast Conifers*. Albany, California: USDA Forest Service, Agriculture Handbook 521, rev. June 1993.

9. Sinclair, Wayne A., Lyon, Howard H., and Johnson, Warren T. *Diseases of Trees and Shrubs*. Ithaca, New York: Cornell University Press, 1987.

10. Smiley, E. Thomas, Nelda Matheny, and Sharon Lilly, *Tree Risk Assessment Best Management Practices, ANSI A300 Part 9: Tree, Shrub, and Other Woody Plant Management—Standard Practices (Tree Risk Assessment a. Tree Structure Assessment).* The International Society of Arboriculture Press. Champaign. IL. 2011.

11. Watson, Gary W., and Neely, Dan, eds. *Trees & Building Sites*. Savoy: The International Society of Arboriculture Press, 1995.